

EMPLOYING CERTIFICATION TO SAFEGUARD WATER SUPPLIES

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Abstract. Contamination by animal manure has become a major issue in Georgia and our entire country. Due to concentrations of animals, excessive amounts of manure are being disposed of on land. Nitrogen and phosphorus from animal manure are impairing the quality of waters used by cities and municipalities for drinking purposes. The U.S. Environmental Protection Agency and the Georgia Environmental Protection Division have revised their water quality regulations governing concentrated animal feeding operations. This paper identifies strategies for encouraging the use of manure as a production input. The first involves agronomic rate applications for nitrogen and phosphorus. The second strategy involves directives that enhance the absorption of manure into the ground for use by crops. Lagoon design offers a third strategy by addressing nutrient losses through seepage or lagoon failure. Alternative uses for poultry litter offer the final strategy for avoiding excess nutrients from the application of manure.

INTRODUCTION

Water has historically served as a conduit for the disposal of refuse, human and animal waste, and byproducts from factories, pipes, and ditches. While waters near populated areas are often the most polluted, agriculture also causes considerable impairment. The Environmental Protection Agency has recognized that specialized concentrated animal feeding operations (CAFOs), given their size, have a greater probability for discharging pollutants than smaller animal operations (Code of Federal Regulations, 2003). Therefore, legislation differentiates animal feeding operations according to size, and large animal feeding operations meeting the legislative definition of a CAFO are classified as point sources of pollutants. Since not all types of animals are the same, the regulations specify threshold numbers of different animal species to be used in designating large and medium CAFOs.

This paper discusses regulations that have been enacted to respond to the impairment of waters by CAFOs. Regulatory provisions concerning the certification of

operators and facilities, design and inspection of lagoons, and accountability requirements delineate practices to reduce potential contamination problems. From the discussion of these regulations, four regulatory strategies can be identified for encouraging the use of manure as a production input. With these ideas, we can strengthen practices that will secure future water supplies.

CONTROLLING ANIMAL POLLUTION

The federal government has delegated responsibilities for administering and enforcing the Clean Water Act to individual states. Consequently, state governments are responsible for permitting under the National Pollutant Discharge Elimination System. Moreover, states determine the appropriate level of protection against the impairment of waters when they adopt water quality standards for the navigable waters within their jurisdiction. Some states have enacted provisions on the certification of operators and facilities, lagoon design, and accountability requirements regarding the closure of operations. These regulations are important in delineating expectations and establishing standards that reduce potential contamination problems (Centner and Mullen, 2004).

Certification of Persons and Facilities

The certification of persons and facilities offers a procedure to oversee environmental problems from the production of animals. This might include applicant training, examination, and the investigation of qualifications. Such requirements may regulate many animal feeding operations that are not CAFOs, and thereby are considerably broader in coverage than the provisions prescribed by the federal CAFO regulations. Under North Carolina legislation, an owner or other person in control of an animal feeding operation with more than 250 swine or 100 cattle needs to be certified (North Carolina General Statutes, 2000).

Iowa requires the certification of commercial manure applicators and confinement site manure applicators, and charges the Department of Natural Resources with the administration of continuing education instructional

courses (Iowa Code, 1999). Illinois has established a certified livestock manager program to enhance management skills dealing with environmental awareness, safety, odor control techniques and technology, best management practices, and manure management plans applying to animal feeding operations with more than 300 animal units (Illinois Compiled Statutes Annotated, 2003).

Design and Inspection of Lagoons

Many state governments have taken action aimed at preventing lagoons from collapsing due to rain events. Given environmental concerns about waste lagoons and other manure storage structures, new regulations incorporating design and inspection safeguards have been adopted. The most common safeguards embody professional requirements for persons involved in designing, operating, and inspecting manure storage structures and lagoons. Generally, the regulatory provisions establish a requirement of design preparation by a professional engineer (Minnesota Rules, 2000). Alternatively, a state may limit the development of lagoons.

Regulations often require some type of liner to preclude contaminants from seeping into the ground and underground water supplies. A limitation on freeboard mandates sufficient room in a lagoon so that a major rain event will not result in the lagoon overflowing. For larger operators and operators with spray irrigation fields, regulations may mandate the installation of groundwater monitoring wells. Another state regulatory response to lagoons is the delineation of provisions concerning inspection. Regulations may establish criteria for the inspection of new lagoons during preconstruction, construction, or operational phases.

Accountability Requirements

States have also moved to adopt provisions to address environmental problems at animal feeding operations that discontinue operations (Centner and Mullen, 2004). Individualized provisions incorporated in state closure regulations adopt several avenues of accountability including commercial or private insurance, guarantees, surety bonds, letters of credit, certificates of deposit, and designated savings accounts (Illinois Compiled Statutes Annotated, 2003). The state may require the operator to provide a detailed written estimate of closure costs, and then establish a closure fund that would meet the estimated obligation.

Closure requirements generally prescribe guidelines on the amount of surety. Illinois requires the level of surety to be determined based upon the volumetric capacity of the lagoon (Illinois Compiled Statutes Annotated, 2003). Alternatively, Oklahoma lists actual monetary amounts dependent upon the number of animal units and outstanding contempt citations or fines (Oklahoma

Statutes, 2000). Additional rules may authorize the forfeiture of funds of licensed operations that neglect, fail, or refuse to properly close surface impoundments. Moreover, the state can order remedial work to be done on premises that fail to follow requirements.

REGULATORY STRATEGIES

A component that is not prominent among the legislative provisions governing CAFOs is how governments might encourage the use of manure as a production input rather than treating it as a waste byproduct (Centner, 2004). By incorporating sustainable ideas in regulations governing animal wastes, further encouragement might be given to help producers recycle nutrients from manure as a production input. Many governmental regulations lack sufficient incentives to advance the more provident use of manure.

Four major regulatory strategies can be identified that address mechanisms for treating manure and animal waste as a production input rather than a waste byproduct for disposal. The first involves rate applications for nitrogen and phosphorus. The second strategy involves directives that enhance the absorption of manure into the ground for use by crops. Lagoon design offers a third strategy to enhance production by addressing nutrient losses through seepage or lagoon failure. Alternative uses for poultry litter offers an additional strategy to avoid excess nutrients being placed on lands near poultry CAFOs.

Rate Application Regulations

Thirty-four states have enacted regulations requiring CAFO wastes be applied to land at agronomic rates (Environmental Protection Agency, 2001). These regulations offer a relevant response to the overuse of one or more nutrients. To comply with the application requirements, farmers employ a nutrient and manure management program. Farmers calculate the nutrients in the manure and the soil to ascertain a crop's need for additional nutrients. The regulations prohibit the application of manure to fields where amounts of the listed nutrient are already present in sufficient quantities for the crop being grown. Nitrogen may be the only listed nutrient, or a state regulation may list both nitrogen and phosphorus.

While rate regulations sound good, more widespread application is possible. One need is to use new technology to more accurately calculate and measure the amount of nitrogen in manure applications that will be available to plants. While soil and manure testing can provide rough calculations regarding amounts of nitrogen, they do not reflect the mineralization of nitrogen nor atmospheric losses. Due to rate regulations, farmers are required to forego applying excessive amounts of listed nutrients that can contribute to unnecessary water

contamination. What this usually means for the application of manure is that a farmer can only apply a quantity required to reach the recommended amount of phosphorus. For nitrogen requirements, an appropriate commercial fertilizer should be used to alleviate the deficiencies and provide for optimal crop production.

Enhancing Absorption of Manure

Although manure management is bothersome and costly, it is indispensable to the oversight of surplus nutrients from animal waste. States have helped farmers by making information available to them on nutrient management plans and in providing testing services. One important development has been recognition that training is required for persons in charge of disposing of manure. State legislatures have adopted provisions requiring training for animal waste management system operators (Georgia Compiled Rules and Regulations, 2004). Yet training efforts may need to be augmented to address the coordination of reliable sampling and testing results with nutrient applications. Many farmers need more training on how to understand and evaluate nutrient testing results.

Some state nutrient and manure management provisions delineate practices that foster the use of nutrients for crop production. Several ideas may be highlighted. Minnesota enunciates a general prohibition against application of manure that would cause contaminated runoff (Minnesota Rules, 2000). On lands prone to flooding, manure application through injection or incorporation into the soil may be required. Similar provisions may apply to steeply sloping cropland. To minimize runoff of manure, some northern states limit the application of manure on snow-covered ground (Illinois Compiled Statutes Annotated, 2003). Another provision may prohibit manure application in road ditches (Minnesota Rules, 2000).

Lagoon Design

While animal waste lagoons are not new, the recent contamination of waters by lagoon collapses has spurred greater regulations (Schmidt, 2000). Particularly important are the design provisions being added by many states through legislation and agency regulations. Advances in science have meant that the design and scale of lagoons have changed considerably. Lagoons have gotten larger, corresponding to larger animal production operations, and have incorporated design specifications that make them less likely to fail. They also may be precluded from environmentally sensitive locations, such as a 100-year flood plain (Georgia Compiled Rules and Regulations, 2004). Governments are incorporating scientific information into lagoon regulations to help safeguard water quality.

The most common safeguards embody professional requirements for persons involved in designing manure storage structures and lagoons. Another common design specification concerns lagoon liners. States have written

detailed rules prescribing liner requirements (Illinois Administrative Code, 2001). Other requirements may require a lagoon capacity determined by analyzing the volume expected to be generated over a designated number of days (Illinois Administrative Code, 2001). Some of the state lagoon regulations might be more proactive in addressing the problems of old lagoons. Furthermore, the adoption of regulations does not guarantee that lagoons will function properly.

Alternative Uses for Poultry Litter

The federal government concluded that a majority of the on-farm excess nitrogen and phosphorus is produced by poultry operations (Environmental Protection Agency, 2003). Given excess nutrients, alternative uses for poultry waste are receiving attention. Poultry manure is often mixed with sawdust in a production facility creating animal wastes quite different from wastes from cows and hogs. This means that there may exist opportunities for the disposal of dry poultry litter quite distinct from the disposal of other types of manure. Possibilities include using poultry litter for compost, burning litter as a fuel, or moving litter to locations away from where it was produced.

In Georgia, a former poultry producer has gone into the composting business (Faucette, 2001). Poultry litter from farms within a 30 mile radius is brought to a facility and enters a composting process. The finished product is marketed as a certified organic product. Alternatively, a facility in Delaware processes poultry litter for export to grain farms in the Midwest (Guy, 2001). Poultry litter may also be developed as a clean-burning source of electric power (Forster, 2000). A major utility hopes to open a plant in Minnesota that uses poultry litter as one of the sources of fuel (Post, 2003).

Maryland has supplemented its nutrient management provisions with a poultry litter matching service and transportation project (Maryland Agriculture Code Annotated, 2001). This attempts to reduce excessive amounts of phosphorus in four counties. On an experimental basis, the state and commercial poultry producers are facilitating the transportation of poultry litter from farms that experience phosphorus over-enrichment to areas where the phosphorus can be used for crop production. In other poultry-producing areas, an industry matching service is being used to find persons willing to receive poultry litter. The Georgia Poultry Federation has found that there is a demand for poultry litter, and has been able to match all excess litter with suitable outlets (Georgia Office of Food Industry Programs, 2000). Through these voluntary programs, excess phosphorus can be moved to fields where it will not create a nutrient pollution problem.

CONCLUSION

Agricultural producers can do more to safeguard water quality. Because preventing pollutants from entering waters involves costs, governments need to take legislative or regulatory action to preclude contamination. The federal and state regulations governing animal feeding operations in the United States show mechanisms that can diminish pollution. Yet even in developed countries, greater efforts are needed. In order to provide quality waters to future generations, additional governmental regulations may be required.

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